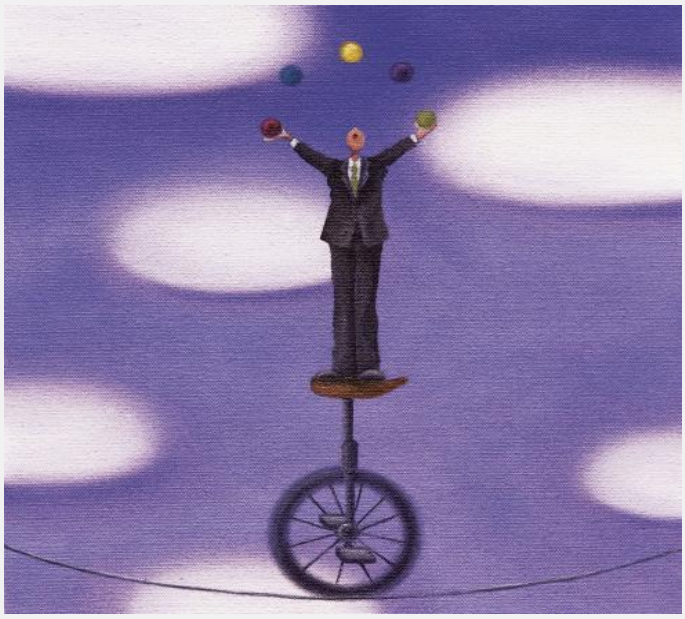
1-2012

Risk management in a volatile market

Singapore Management University

RISK MANAGEMENT IN A VOLATILE MARKET

Published:
19 Jan 2012



As stock markets around the world whipsaw in a manner that bewilders even the seasoned trader, an academic has suggested for financial institutions to look more closely at linking dynamic loss tail distributions to contagion modeling for effective risk management.

In '*Global Financial Risks and Changes in Conditional Value-at-Risk*', Lim Kian Guan, a professor of finance atSMU's Lee Kong Chian School of Business, looked at the dynamics of current global equity markets and the multivariate global markets return loss distributions.

Statistical analyses using conditional distributions on the tail losses of equity portfolios constructed from the stock indexes of six major global financial markets show the prevalence of heightened global financial risks and its contagion effect across the globe.

"Trying to understand how contagion works, and being able to model it more accurately, will be very useful for financial institutions to manage financial risks in the extremely turbulent financial markets today," said Lim.

The paper was selected for the "Best Paper" award at the World Business, Economics and Finance Conference, organised by the Australian based World Business Institute, held in Bangkok in September 2011. It also featured as a top-ten weekly most downloaded paper on the Social Science Research Network.

The increased dependency of equity markets

The global financial crisis of 2008 saw US stock prices freefalling by about 25 per cent within a ten-day period two weeks before Black Friday, on 10 October 2008, and within two weeks after the collapse of Lehman Brothers on 15 September 2008. On the former, markets across the globe fell in contagion as theyreacted to carnage on Wall Street overnight with the US markets falling to a fresh five-year low amid rekindled fears of a looming global recession caused by the credit crisis.

Since then, equity markets have become more inter-dependent and move more closely in tandem whenever shocks hit the market, said Lim in his paper.

Two observations can be drawn from the situation.

One is that country stock markets, having evidenced more frequent and sudden sharp losses, have heightened the attention given to investment funds, risk management, and the careful monitoring of portfolio positions.

Two, such drops appear to be global, experiencing a contagion effect across countries around the globe within a matter of several trading hours or within the next trading day, said Lim.

Summing up his observations, Lim said: “So there are two things. First, since October 2008, the downside risks have become more prevalent and more extreme when they occur.”

“Secondly, every time it is down, the degree of correlation across markets, which is called 'contagion', is much higher.”

He said the US market, being the largest capital market in the world, until the 2011 European sovereign debt crisis, has often led movements in the financial markets of Asia and Europe. An exception would be the 1997 Asian financial crisis.

Studying the contagion methodically

It was the lack of rigorous methods using empirical data and advanced econometrics to verify both effects that compelled Lim to the study.

For analysis, he collected the daily stock index returns of US, UK, Germany, France, Japan and Hong Kong – whose equity portfolios represent the largest equity markets in the world – over a 20.5-year sampling period, ending in June 2011.

The focus was put on the conditional distribution based on the return losses exceeding the respective country index thresholds, which was fixed at the five per cent probability loss region, or 1.645 times the standard deviation (from the unconditional total sample mean) in the direction of the tail loss. Lim then investigated if sharp drops are accompanied by changes in the tails of the conditional probability distribution of return losses. He also studied the contagion effect across countries using the copula method(which is used in statistics studies and probability to describe the dependence between random variables), and changes in the relevant copular parameter as a characterisation of the conditional multivariate loss tail distribution.

The ‘tail loss' is the area most critical to the risk-taking and risk management decisions made by banks and financial institutions. It is also the area that regulatory bodies worldwide are most concerned with, as each of the advanced economies with a mature financial market would be subject to sharp losses and contagion risk,” Lim explained.

The finding was that between September 2008 and June 2011, equity portfolio losses were met with significant increases in high-loss associations across the major countries – and this occurred in conjunction with significant higher losses in each country. Lim uncovered this using the generalized marginal Pareto distribution and the multivariate Clayton copula.

The implication: “There is now strong empirical evidence, supported by rigorous methodology, to assert the prevalence of heightened global financial risks and its contagion effect across the globe,” he said.

Where accuracy matters more

The increase in the copula parameter coupled with distributional changes in longer and fatter tails in the negative or return loss region of the major country financial stock markets send a "very strong message" of unprecedented risk peaking, if and when the markets experience huge losses.

This is why banks under the Basel II and Basel III accords, and other financial institutions should not underestimate its Conditional Value-at-Risk – which can happen if they were to use the normal distribution model. Under stress, the portfolio return distributions have tails that simultaneously grow longer and thinner in the direction of the loss region, said Lim.

“There have been standard techniques used by most banks. However this paper adds an interesting idea of linking dynamic loss tail distribution to contagion modelling. If banks consider this, or had already done so, their forecasting would be more effective in avoiding major market meltdowns or major market loss events,” Lim added.

After all, banks today, more than ever, are faced with a great urgency to forecast their market, credit, operations, and liquidity risks accurately. Models that take into account present dynamics will, of course, yield greater accuracy. “This is critical for effective risk management in banks or financial institutions in the new and less understood risk landscapes we are now threading,” he concluded.